

What is claimed is:

1. A test and measurement instrument for multi-channel mask testing, comprising:

a group of M signal input terminals for receiving M signals from a circuit under  
test;

an acquisition system coupled to said M signal input terminals for acquiring  
samples of a waveform at each of said M signal input terminals;

a controller for generating mask pixel data defining a mask;

a memory for storing said waveform samples and said mask pixel data, said  
mask pixel data including an identification code;

comparison circuitry for reading a memory location, and determining if any  
acquired waveform sample of said signal from each of said M signal input terminals  
is to be written into a memory location currently storing a mask pixel, causing a  
mask violation; and

display circuitry for simultaneously displaying a representation of said mask and  
all of said waveforms from said M signal input terminals.

2. The test and measurement instrument of claim 1 wherein,

said comparison circuitry is a rasterizer;

said memory is a raster memory;

said comparison is performed by said rasterizer examining pixel data of said  
raster memory for said identification code as said waveform samples are composited  
into said raster memory; and

said comparison being performed sequentially on a waveform basis.

3. The test and measurement instrument of claim 2, wherein

Each of said waveforms is displayed in a different one of M colors and said telecom  
mask is displayed in an M+1 color.

4. The test and measurement instrument of claim 3, wherein  
in response to a determination of a mask violation, said rasterizer increases an intensity  
value of said waveform sample violating said mask prior to compositing said sample into said  
raster memory.

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5. The test and measurement instrument of claim 1 wherein said controller generating mask  
pixels is a microprocessor.

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6. The test and measurement system of claim 1 wherein said controller generating mask  
pixels is a dedicated ASIC.

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7. The test and measurement instrument of claim 1 wherein:  
said test and measurement instrument is a digital oscilloscope.

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8. A test and measurement system for multi-channel mask testing, comprising:

a multiplexer having N input channels and M output channels, where N is greater than M, and M is greater than one, for selecting ones of said N-channels in groups of M-channels at a time in response to a first control signal;

each of said N input channels being coupled to receive a signal from a respective one of N output channels of a circuit under test;

a test and measurement instrument operating in response to a second control signal, and including:

a group of M signal input terminals, each of said M signal input terminals being coupled to a respective one of said M signal output channels;

an acquisition system coupled to said M signal input terminals for acquiring samples of a waveform at each of said M signal input terminals;

a controller for generating mask pixel data defining a mask;

a memory for storing said waveform samples and said mask pixel data, said mask pixel data including an identification code;

comparison circuitry for reading a memory location, and determining if any acquired waveform sample of said signal from each of said M signal input terminals is to be written into a memory location currently storing a mask pixel, causing a mask violation; and

display circuitry for simultaneously displaying a representation of said mask and all of said waveforms from said M signal input terminals; and

a controller coupled to said multiplexer and to said test and measurement instrument for generating said first and second control signals.

9. The test and measurement system of claim 8 wherein,

said comparison circuitry is a rasterizer;

said memory is a raster memory;

said comparison is performed by said rasterizer examining pixel data of said raster memory for said identification code as said waveform samples are composited into said raster memory; and

said comparison being performed sequentially on a waveform basis.

10. The test and measurement system of claim 9, wherein  
each of said waveforms is displayed in a different one of M colors and said telecom  
mask is displayed in an M+1 color.

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11. The test and measurement system of claim 10, wherein  
in response to a determination of a mask violation, said rasterizer increases an intensity  
value of said waveform sample violating said mask prior to compositing said sample into said  
raster memory.

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12. The test and measurement system of claim 8 wherein said controller generating mask  
pixels is a microprocessor.

13. The test and measurement system of claim 8 wherein said controller generating mask  
pixels is a dedicated ASIC.

14. The test and measurement system of claim 8 wherein:  
said test and measurement instrument is a digital oscilloscope.

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15. A method for performing multi-channel mask testing in test and measurement system including a test and measurement instrument having mask testing capability, comprising the steps of:

selecting M channels at a time from a group of N channels;

5 acquiring samples of waveforms at M input terminals coupled to said M channels;

generating mask pixel data defining a mask;

storing said waveform samples and said mask pixel data in a memory, said mask pixel data including an identification code;

10 comparing mask pixel data and waveform sample data by reading a memory location, and determining if a waveform sample of said acquired waveform samples is to be written into a memory location currently storing a mask pixel, causing a mask violation;

compositing said waveform samples into a raster memory;

15 displaying simultaneously said mask and said M waveforms on a display screen.

16. The method of claim 15 wherein,

20 said comparing step is performed by a rasterizer examining pixel data of said raster memory for said identification code as said waveform samples are composited into said raster memory; and

said comparison of said samples is made on a waveform basis.

25 17. The method of claim 15, wherein said displaying step includes:

displaying each of said waveforms in one of M different colors and displaying said mask in an M+1 color.

30 18. The method of claim 16, further including the step of:

increasing an intensity value of a sample determined to cause a mask violation before compositing said sample in said raster memory.